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New Species of North American Fungi from various Localities.

By J. B. Ellis and B. M. Everhart.

HYMENOMYCETES.

Myriadoporus subsulphureus E. & E.

On decaying wood, Denver, Colo., May, 1897. (Prof. E. Bethel, no. 239.)

Effused, immarginate, wood-color or grayish-white outside, light sulphur-yellow within, of a brittle corky texture, stratose, 4–5 mm. thick, extending continuously for 5–6 cm. or more; pores imperfectly developed, not continuous and cylindrical, but mere cavities scattered irregularly through the substance, more abundant near the surface.

Has the general appearance of *Poria vulgaris* Fr. or *P. obducens* Pers.

Peniophora occidentalis E. & E.

On dead limbs of deciduous trees, Canada to Colorado, westward. N. A. F. 2314.

Effused for 4–6 cm. in extent, with margin more or less reflexed and strigose-tomentose, dirty white, not zonate; hymenium pale lilac color, fading out, farinose; cystidia slender, rugulose-roughened and slender-pointed, 75–110×13–16μ; spores elliptical, 1–2 nucleate, 12–15×5–7μ.

PYRENOMYCETES.

Rosellinia subcompressa E. & E.

On old decorticated cottonwood limbs, Aberdeen, So. Dakota, Apr., 1897 (D. Griffiths, no. 7).

Gregarious, depressed-globose, about ¼ mm. diam., base

slightly sunk in the surface of the wood; ostiolum papilliform; asci cylindrical, short-stipitate, paraphysate, 8-spored; sporidia uniseriate, elliptical, compressed, 6–9×5–6μ and about 3½μ thick.

The sporidia are obtusely rounded at the ends when viewed in front, but subacute when seen edgewise.

AMPHISPHAERIA MELANTERA E. & E.

On bark of *Quercus undulata*, Deansbury, Colo., Apr., 1897. (E. Bethel, no. 230.)

Perithecia erumpent-superficial, ovate-globose, black, ½–¾ mm. diam., scattered; ostiolum obscure, at length perforated; asci oblong-cylindrical, subsessile, 100–110×20–22μ, with abundant filiform paraphyses; sporidia biseriate, oblong, uniseptate, strongly constricted at the septum so that the two cells easily separate, the lower cell mostly narrower, brown, 20–35×12–15μ.

A. Querceti Cke. & Mass., has larger perithecia and uniseriate smaller sporidia only slightly constricted.

TEICHOSPORA POPULINA E. & E.

On decorticated weather-beaten limbs of *Populus monilifera*, Rooks Co., Kansas. (Bartholomew, 2388.)

Perithecia scattered, semierumpent, subglobose, about ½ mm. diam., partly covered by the loosened fibers of the wood; ostiolum papilliform; asci cylindrical, subsessile, paraphysate, 8-spored, 110–120×8–10μ; sporidia uniseriate, ovate-elliptical, 3–5-septate, constricted at the septa, more strongly so at the middle one, brown, 15–22×7–8μ, the inner cells divided by a longitudinal septum.

LOPHIOSPHAERA RHODOSPORA E. & E.

On the inner surface of cast-off bark, Ohio. (Morgan, no. 1162.)

Perithecia erumpent-superficial, gregarious, ovate-conical, laterally compressed, 200–250μ diam., submembranous, ostiolum narrow, subcompressed or simply papillate, soon perforated; asci clavate-cylindrical, 70–75×10–12μ (paraphysate)? 8-spored, short-stipitate; sporidia uniseriate and oblique or biseriate, ovoid-elliptical, rosy-hyaline, uniseptate, scarcely constricted, 12–14×5–6μ.

The mass of sporidia is distinctly rose-colored, giving by translucence the same color to the young perithecia which, however, soon become black. On account of the slightly compressed ostiolum this might be referred to *Melanopsamma*. The material was too scanty to decide conclusively.

LOPHIOSPHAERA ZEICOLA E. & E.

On old corn stalks (*Zea Mays*), Rooks Co., Kansas, May, 1897. (Bartholomew, no. 2407.)

Perithecia gregarious, ovate-globose, buried, except the apex and erumpent black shining narrow compressed ostiolum, about ½ mm. diam; asci oblong-ovate, short-stipitate, obsoletely paraphysate, 8-spored, 35–45×10–12μ. Sporidia biseriate, ovate, uniseptate, not constricted, smoky-hyaline, 8–10×4μ.

The asci and sporidia resemble those of *Sphaerella*.

PLEOSPORA JUGLANDIS E. & E.

On dead limbs of *Juglans nigra*, Rooks Co., Kansas, April, 1897. (Bartholomew, no. 2405.)

Perithecia gregarious, small, 400–500μ diam., whitish inside, sunk in the bark but raising the epidermis into numerous small pustules which are barely pierced by the minute punctiform ostiolum; asci cylindrical, 75–85×10μ, short-stipitate, 8-spored, paraphysate.; sporidia uniseriate, oblong-elliptical, 3- (exceptionally 5-) septate, the two inner cells divided by a longitudinal septum, scarcely constricted, but the 5-septate spores sometimes constricted in the middle, yellow-brown, 15–22×8–10μ.

Has the habit of *Clypeosphaeria Hendersonia* Ell.

METASPHAERIA SERIATA E. & E.

On dead herbaceous stems (Umbelliferae)? Deansbury, Colo., Apr. 1897. (Bethel 233.)

Perithecia semierumpent, globose, minute (80–100μ), arranged in narrow elongated strips, several centimeters long and about ½ cm. wide, the surface of the stem occupied by these being slightly blackened; ostiola papilliform, indistinct; asci clavate-cylindrical, sessile, 45–50×8–10μ, paraphysate, 8-spored. Sporidia crowded-biseriate, fusoid, hyaline, faintly 1–3-septate, 25–27 ×3μ.

METASPHAERIA RUBICOLA E & E.

On dead canes of *Rubus deliciosus*, Golden, Colo., March, 1897. (Bethel 179 & 208).

Perithecia scattered or seriate, sometimes in groups of 3–4, connected at base by a thin stromatic crust, globose, 400–500μ diam. slate-color inside, buried in the bark and penetrating to the wood, with the apex and papilliform ostiolum erumpent; asci cylindrical, subsessile, paraphysate, 100–115×10–12μ; sporidia uniseriate, oblong or oblong-elliptical, 3-septate, not constricted, ends rounded and obtuse, hyaline, 15–20×8–10μ.

Valsa macrocarpa E. & E.

On dead limbs of *Quercus macrocarpa*, Rooks Co., Kansas, Ap. 1897. (Bartholomew, no. 2393.)

Perithecia ovate-globose, about ½ mm. diam., 15–30 in a cortical stroma formed from the unchanged substance of the bark, closely packed in a single layer, subangular from mutual pressure; ostiola erumpent mostly around the margin of a light-brown disk, black, rounded at the tips, becoming flattened and umbilicate; asci clavate-cylindrical, p. sp. 23–30×5–6μ; sporidia biseriate, allantoid, rather strongly curved, hyaline, 6–7×1¼–1½μ.

The disk is at first convex, but finally plane, rising but little above the epidermis which it perforates and raises into slight pustules.

Eutypella Tiliae E. & E.

In bark of dead *Tilia Americana*, Canada (Macoun).

Stroma cortical, formed of the unaltered substance of the bark, not circumscribed; perithecia circinate, ovate-globose, ½ mm. diam., buried in the inner bark, necks converging and terminating in an erumpent fascicle of ovate-conical quadrisulcate ostiola; asci clavate-cylindrical, 40μ long (including the slender stipe), p. sp. 22–25×3μ, paraphysate, 8-spored; sporidia biserate above, allantoid, hyaline, 4–4½×1μ.

The tufts of ostiola are ½–¾ mm. across, the tips slightly spreading.

Valsaria Xanthoxyli E. & E.

On *Xanthoxylum Clava-Herculis*, St. Martinville, La., March, 1897. (Rev. A. B. Langlois, no. 2500.)

Stromata pulvinate, 2–6 mm. diam. consisting mainly of a brownish-black subcarbonaceous crust of rather loose texture, covering the small, ovate-oblong, 1×¼–⅓μ, membranous, perithecia which are seated in a closely packed group on the unaltered surface of the wood; ostiola tuberculiform-conical, at length broadly perforated or umbilicate; asci cylindrical, p. sp., 75–80×8–10μ, with abundant paraphyses; sporidia uniseriate, elliptical, uniseptate and mostly constricted, brown, 12–14×6–7μ.

Curreya rimosa E. & E.

On dry hard wood of *Arctostaphylus tomentosa* (Manzanita), San Diego, Calif., July, 1896. (Bethel, no. 87.)

Stroma erumpent, superficial, tuberculo-hemispherical or oftener hysteriiform-elongated, 1–2 mm. long, ½ mm. broad, flattened above, surface minutely roughened, black or, when pre-

maturely dried, reddish and transversely cracked; ascigerous cells globose, minute; asci obovate, 75–80×40–45μ, subsessile, paraphysate, 8-spored; sporidia crowded, biseriate, obovate-oblong, slightly curved, yellowish, obtusely rounded at the ends, at first 3-septate, becoming 5–7-septate and muriform, 30–40× 15–20μ.

DISCOMYCETES.

Sarcoscypha alpina E. & E.

On the ground, Nederland, Colorado, May 4, 1897. (D. M. Andrews.) Comm. Prof. E. Bethel, no. 238.

Stipitate, 2 cm. high. Stipe, 1½ cm. high, about 2 mm. thick, clothed with short grayish-white tomentum, enlarged above into the cyathiform ascoma ½ cm. high, 3–4 mm. broad with the margin erect and sublobate, clothed externally like the stipe and with a few white spreading hairs, substance carnose, with a rose-colored tint; hymenium orange; asci cylindrical, 210–250× 20–22μ; paraphyses stout, clavate, thickened above; sporidia uniseriate, elliptical, subinequilateral, subattenuated towards each end but obtuse, with one large nucleus and 1 or 2 smaller ones, 30–35×13–16μ.

Closely allied to *S. floccosa* (Schw.) but lacks the abundant spreading hairs of that species and has larger sporidia.

Tapesia tumefaciens E. & E.

On swollen dead stems of *Bigelovia graveolens*, Colorado, Jan., 1897. (E. Bethel.)

Ascomata densely gregarious, or in broad strips erumpent through cracks in the bark, seated on a thin sporidesmoid subiculum, when fresh orbicular, about 2 mm. diam., mouse-color, disk concave, margin slightly incurved; substance soft carnose, cellular, the margin fringed with olivaceous septate straight hairs, about 75μ long, and 3–4μ thick at the tips; asci clavate-cylindrical, 70–75×8–10μ, short-stipitate, 8 spored; paraphyses stout, simple, subundulate above, about 2μ thick, sporidia obliquely uniseriate, elliptical, hyaline, 8–11×5–6μ.

When dry the opposite sides of the ascomata are rolled together in a hysteriiform manner. The habit is that of *Angelina rufescens* Duby. The mycelium penetrates the wood and causes the stems to swell in the same manner as *Montagnella tumefaciens* E. & H.

CORYNE MICROSPORA.

On decaying logs, Canada (Macoun.)

Cespitose. Ascomata carnose-gelatinous, light liver-color, ½–1 cm. across, depressed in the center, contracted below into a short thick stipe; when dry, almost exactly the color of dried raisins, and more or less wrinkled and folded; asci cylindrical, stipitate, paraphysate, 70–75×5–6μ, 8-spored; sporidia uniseriate, elliptical, 2-nucleate, hyaline, 5–6×2½–3μ.

Has the general aspect of *Coryne urnalis* Nyl., but ascomata larger and sporidia much smaller.

USTILAGO SPOROBOLI E. & E.

On *Sporobolus cryptandrus* Gray, foothills of the Rocky Mountains, Colorado, July, 1895. Coll. J. C. Cowen, Comm. Prof. C. S. Crandall, no. 156[e].

Investing the culms within the sheaths and completely surrounding them for several cm. in extent with a thin even brownish-black layer of minute globose or elliptical 3–4μ spores.

UREDINEAE.

UROMYCES BICOLOR E. & E.

On leaves on *Allium rigidum*, Tulare Co., California, August, 1891. "Death Valley Expedition," no. 1499, Coville & Funston.

Aecidia amphigenous, on the tips of the leaves, thickly scattered; pseudoperidia hemispherical and closed at first, then erumpent and open, about ¾ mm. diam., margin coarsely toothed; aecidiospores obovate, elliptical or subglobose, 22–30×15–20μ, smooth; uredo-sori small (¾–2 mm.), oblong or elliptical, soon naked, light yellow; uredospores elliptical, smooth, pale, membrane 2–3μ thick. Teleutospore-sori punctiform, black, densely gregarious or confluent in crowded groups ¾–1½ mm. long by ½–1 mm. wide, permanently covered by the epidermis. Teleutospores obovate or pyriform, 20–30×15–22μ, pale brown; epispore smooth, scarcely thickened at the apex; pedicels short (15–25μ), hyaline, easily deciduous.

A well marked species, easily recognized by the difference in color and structure of the uredo and telentospore sori.

PUCCINIA ERIGERONTIS E. & E.

On leaves of *Erigeron caespitosus* Crow Creek, Wyoming, July, 1896. (Prof. Aven Nelson, no. 2847.)

III. Sori amphigenous, naked, ½–¾ mm. diam., mostly clus-

tered in patches 2–4 mm. across, sometimes subcircinately arranged, orbicular, black, seated on pale yellowish spots; teleutospores oblong or oblong-elliptical, broadly constricted, uniseptate in the middle, the lower cell paler and rounded below; upper cell mostly broader and darker, contents granular; epispore smooth, thickened above, with or without a papilla, 38–60×15–21μ (mostly 40–50×18–20); yellowish-brown, on pedicels mostly a little longer than the spores, persistent and yellowish above.

Differs from *P. doloris* Speg., in its amphigenous growth, black sori and rather larger spores.

PUCCINIA DUTHIAE Ell. &. Tracy.

II., III. Amphigenous; sori small, oval, black, distinct; uredospores subglobose, epispore thin, slightly echinulate, 30–40 by 35μ; teleutospores broadly oval, slightly constricted, ends rounded, not thickened, smooth, dark brown when mature, 40–45 by 26–30μ; pedicel with a distinct enlargement at the base of the spore, tapering below, tinted, twice or thrice the length of the spore.

On *Andropogon intermedius* and *A. pertusus*, India. Com. by. J. F. Duthie.

PUCCINIA NUTTALLII E. & E.

On living leaves, petioles and flowers of *Cyrtorhyncha Nuttallii*. Foothills of the Rocky Mountains, Colorado, June, 1895. (J. H. Cowen), comm. Prof. C. S. Crandall.

III. Sori at first covered by the lead-colored epidermis, soon naked, pulverulent and then nearly black; on the leaves thin and small, confluent and flat; on the petioles, elongated, sub-linear; spores elliptical, varying to oblong or obovate-elliptical, rounded at the ends, and mostly crowned with a small flat papilla, epispore thick but not distinctly thicker at the apex, nearly even at first, but in the mature spore coarsely but not prominently tubercular-roughened, yellowish-brown becoming dark-brown, 25–40× 18–20μ.

Closely allied to *P. Ranunculi* (Seymour) and to *P. gibberulosa* Schrtr., but the habit and roughening of the epispore is different.

PUCCINIA IRREGULARIS Ell. & Tracy.

On *Solidago* sp. Pike's Peak, Colo. (Tracy); on *Solidago spectabilis* var. *rigidiuscula*, Nebraska (Bates).

III. Amphigenous but more abundant below; sori small, subhemispherical, clustered or subcircinate on small pallid spots; teleutospores elliptical or oblong-elliptical, constricted, 50–70× 20–30μ, epispore smooth, pale brown, strongly thickened at the

apex and prolonged into a subhyaline conical papilla; pedicels slightly tinted, 80–110μ long.

The spores are sometimes quite irregular; sometimes 3-celled, with upper septum perpendicular or inclined, and the upper cell with two apiculi. Mesospores (unilocular spores) tolerably abundant, 30–40×18–22μ.

Differs from *P. Solidaginis* Pk. in its much smaller sori, narrower, more pointed spores and longer pedicels.

PUCCINIA LUDIBUNDA E & E. Proc. Acad. Nat. Sci. Phil. **1893**: 153. N. A. F. no. 3243.

The description of this species is incomplete, no mention being made of the *Uredo*. This occurs in minute oblong pale orange-colored sori, about 1 mm. long, at first covered by the epidermis, but soon exposed, though inconspicuous. Uredospores obovate, 16–22×12–14μ, pale orange, faintly aciculate. Pedicels deciduous. The teleutosori also occur on both sides of the leaf.

AECIDIUM PHLOGIS E. & E.

On *Phlox longifolia*, near Lewiston, Idaho, Apr., 1896. (Heller, no. 2992.)

Aecidia hypophyllous, evenly scattered, pustuliform at first, soon open and shallow cup-shaped with the margin coarsely lacerate-toothed; spores globose or sub-elliptical or sub-angular, orange-yellow, smooth, 15–20μ diam.

This is not improbably the *Aecidium* of *Puccinia plumbaria* Pk. which is found on this same host.

AECIDIUM ILICINUM E. & E.

On living leaves of *Ilex opaca*, Nuttallburg, West Va., Apr. 20, 1896. (L. W. Nuttall, no. 839).

Spots amphigenous, purplish-black above, dirty-orange below, indefinite. Aecidia hypophyllous, mostly only one in the center of a spot, hemispherical or tuberculiform and closed at first, then laciniately dehiscent and margin coarsely toothed; aecidiospores irregular in shape, globose, ovate, elliptical or subangular, 18–22μ in the longer diameter, epispore more or less wrinkled or tuberculate-roughened.

AECIDIUM TISSAE E. & E.

On leaves and stems of *Tissa macrotheca*, San Jacinto, Calif., March, 1896. (McClatchie, no. 1137.)

Scattered or clustered; aecidia small; short-cylindrical, margin

slightly toothed; spores sub-globose or elliptical, smooth, 14–18μ diam., bright orange, at first soon fading.

URedo Eriocomae E. & E.

On leaves of *Eriocoma caespitosa*, Mojave Desert, Kern Co., Calif., May, 1892. Coll. D. W. Coquillett; comm. Miss May Varney.

Sori mostly epiphyllous, linear, soon naked, dark brown, 1–4 mm. long; uredospores elliptical, pale brown, 20–30×10–12μ, epispore thick, rather coarsely, but only slightly tuberculo-echinulate-roughened, mostly filled with large oil globules; pedicels weak, slender, hyaline, deciduous, 20–30μ long.

SPHAEROPSIDEAE.

Phyllosticta livida E. & E.

On leaves of *Quercus Douglasii*, Amador Co., Calif. (Hansen, no. 1218.)

Spots large (1 cm.), subindefinite, brown below, livid brown above; perithecia amphigenous, numerous, covered by the livid epidermis, which is raised into small pustules and only tardily ruptured; sporules minute (3×1μ), numerous, hyaline.

Phyllosticta gallicola E. & E.

Parasitic on the fungoid gall known as "*Rhytisma Solidaginis*," Colorado, 1896. (Bethel, no. 221.)

Perithecia numerous, amphigenous, globose, about 210μ diam., fringed with brown mycelium, buried except the erumpent apex, which is rather broadly perforated; sporules elliptical, smoky-hyaline, 6–15×6–8μ.

Phyllosticta Eucalypti E. & E.

On the dead brown extremities or upper half of the leaves of *Eucalyptus*, California. (Bethel.)

Perithecia amphigenous, evenly scattered, innate-erumpent, globose, 100–120μ diam.; sporules oblong, 5–8×1½–2½μ.

Phyllosticta Wislizeni E. & E.

On leaves of *Quercus Wislizeni*, Amador Co., Calif., 1896. (Hansen, no. 1502.)

Epiphyllous, on dirty brown subindefinite spots or dead areas of the leaf, often terminal or lateral, and subconfluent; perithecia at first covered by the blackened pustuliform-elevated epidermis, which is at length variously ruptured, often by a fissure running across the pustule, with the aspect of *Hysterium*, 250–300μ diam.,

globose or oblong; sporules oblong-elliptical, hyaline, 10–12×5–6μ, sometimes a little bulging on one side.

PHYLLOSTICTA SPHAEROPSISPORA E. & E.

On leaves of *Solidago confinis*, Pasadena, Calif., Dec. 1895. (Professor A. J. McClatchie, no. 1051.)

Spots suborbicular, white, 3–10 mm. diam., with a narrow brown slightly raised margin; perithecia epiphyllous, hemispheric, prominent, black, 100–120μ diam; sporules obovate-elliptical, 13–16×6–7μ, brownish, on stout pedicels 15×2½μ.

PHYLLOSTICTA FIMBRIATA E. &. E.

On leaves of *Arbutus Menziesii*, Ashland, Oregon, June, 1895. (Dr. J. J. Davis, no. 956.)

Spots amphigenous, rusty brown below, cinereous, purple-margined and slightly raised above, irregular in shape, 2–6 mm. diam.; perithecia epiphyllous, not abundant, gray, 200–300μ diam.; hemispheric-prominent, fringed around the base with straight spreading simple closely septate hyphae 50–75×5μ. Sporules variable in shape, oblong, 3–5×1½, elliptical, 4–6×2–3μ, or globose, 5–6μ.

PHOMA THAPSI E. & E.

On dead stems of *Verbascum Thapsus*, Newfield, N. J., May, 1897.

Perithecia subhysteriiform, covered by the blackened epidermis which is pierced by the papilliform ostiolum; sporules oblong-elliptical, binucleate, obtuse, 5–6×2½μ.

Differs from *P. verbascicola* (Schw.) in its differently shaped perithecia and larger 2-nucleate sporules.

PHOMA CALIFORNICA E. & E.

On dead and dying stems of *Gentiana serrata*, San Bernardino Mts., Calif., S. B. Parish; comm. A. J. McClatchie.

Perithecia subcuticular, covered by the slightly raised and blackened epidermis; sporules oblong, 3×¾μ.

Differs from *P. Niesslii* Sacc. and *P. Gentianae* J. Kuhn, in its much smaller sporules.

MACROPHOMA NERVICOLA E. & E.

On the nerves of the leaves of *Quercus alba*, in company with *Leptothyrium dryinum* Sacc., Racine, Wis., Aug., 1896. (Dr. J. J. Davis, no. 963.)

Perithecia buried with the apex slightly erumpent, 80–120μ diam., sometimes two or three subconfluent; sporules oblong-fusoid, hyaline, 14–21×6–8μ.

M. dryina (B. & C). is a ramicolous species with smaller (15×6–7μ) spores.

APOSPHAERIA NUCICOLA E. & E.

On old hickory nuts lying on the ground, Newfield, N. J., April, 1897.

Perithecia superficial, gregarious, often clustered and subconnate, ovate, smooth and black above, with a distinct papilliform ostiolum; sporules elliptical, hyaline, 2½–3½×1¼–1½μ.

ASTEROMA SENECIONIS E. & E.

On leaves of *Senecio Rawsoniana*, Yosemite, California, June, 1895. (Davis, no. 9513.)

Spots orbicular, light yellow, ¼–1 cm. diam.; perithecia amphigenous, 50–90μ diam., astomous at first, then with a large opening above, seated on a mycelium like that of the Erysipheae; sporules minute, cylindrical, 4–5× less than 1μ.

The perithecia are densely gregarious and form a broad black belt around the margin of the spots, the central portion (2–3 mm. diameter) being occupied by *Gloeosporium Senecionis* E. & E.

This is an anomalous *Asteroma*, lacking the usual radiating fibrils.

FUSICOCCUM PERSICAE E. & E.

On dead limbs of peach trees, St. Martinville, La., March, 1896. (Langlois, no. 2466.)

Stroma tuberculiform, ¾ mm. diameter, semierumpent through the epidermis, of coarse cellular structure, multilocular cells small (150μ), white, numerous; sporules oblong-fusoid, hyaline, continuous, 18–22×6–7μ, on basidia shorter than the sporules.

CYTISPORELLA CARNEA E. & E.

On dead limbs of *Castanea*, Nuttallburg, West Va., March, 1896. (L. W. Nuttall.)

Stroma at first tuberculo-hemispherical and covered by the epidermis, soon erumpent through the transversely or laciniately ruptured epidermis, brown outside, white and of firm consistence within (except the central portion), multilocular cells light-colored; sporules elliptical, hyaline, continuous, 5–7×2½–3μ.

The stroma is about 1½ mm. wide and 1 mm. high and finally shrinks away from the ruptured epidermis and then is more or less distinctly flesh-colored.

CYTISPORA TUMULOSA E. &. E.

On dead buds of *Magnolia Fraseri*, Nuttallburg, West Va., March, 1896. (Nuttall, no. 808.)

Stroma cylindric-conical, erumpent, brown, lighter inside, about 1 mm. rboad, the upper erumpent part ¾ mm. high; sporigreous cells perithecioid, whitish, globose, sunk in the lower part of the stroma; sporules allantoid, hyaline, curved, 6–8× 1½μ.

CYTISPORA ANNULARIS E & E.

On bark of dead *Fraxinus Americana*, Aberdeen, So. Dakota, Apr. 1897. (David Griffiths, no. 1.)

Stroma sunk in the inner bark, ovate-globose, about 300μ diam., cells obsolete, apex erumpent, with a small round opening surrounded by a white ring, presenting outwardly almost the same appearance as *Stictis stigma* C. & E; sporules allantoid, 4–5× 1¼μ on fasciculate basidia 12×1½μ branched above.

Sporules smaller than in *C. leucosticta* E. & B. or *C. albiceps* E. & K. and larger than in *C. leucostoma* B. & C.; evidently different from *C. Persicae* Schw. and from *C. leucostoma* Sacc.

SPHAEROPSIS COMPTONIAE E. & E.

On dead shoots of *Comptonia*, Newfield, N. J. Apr. 1897.

Perithecia scattered, globose, 300μ diam., buried except the erumpent apex; sporules oblong-elliptical 15–20×9–10μ.

DIPLODIA MELIAE E. & E.

On dead limbs of *Melia*, Louisiana. (Langlois, no. 2446.)

Perithecia scattered, or sometimes 2 or 3 together, at first covered by the epidermis but soon suberumpent; sporules oblong-elliptical, 17–20×8–10μ, becoming tardily uniseptate.

DIPLODIA PARAPHYSATA E. & E.

On bark of *Tilia*, Nuttallburg, West Va., March, 1896. (L. W. Nuttall, no. 832.)

Perithecia sub-cuticular, depressed-globose, pilose-tomentose, black (white inside) 300–400 μ diam., with papilliform ostiolum, raising the epidermis into pustules and finally rupturing it, thickly scattered, often 2–3 sub-confluent; sporules ovate-elliptical, hyaline at first, then brown and uniseptate but not constricted, 22–27×12–15μ, accompanied by stout branching paraphyses 100–110μ long by 1½–2μ thick and borne on stout basidia mostly shorter than the sporules.

Melanconis tiliacea Ell. was found on the same specimens.

Ascochyta Fraserae E. & E.

On stems of *Frasera speciosa*, Deansbury, Colo., Apr., 1897. (Bethel, 234.)

Perithecia scattered, sub-cuticular, depressed-globose, 80–110μ diam., perforated above, of cellular-membanous texture; sporules oblong, obtuse, uniseptate, narrower in the middle, hyaline 1,2–15×4–5μ.

Hendersonia cylindrospora E. & E.

On some coarse umbelliferous plant, Denver, Colo., May, 1897. (Bethel, 247).

Perithecia scattered, minute, subcuticular; sporules cylindrical, obtuse, 3-septate, yellow-brown, slightly constricted at the septa, 18–22×6–7μ.

Camarosporium Chenopodii E. & E.

On dead stems of *Chenopodium*, Fort Collins, Colorado, March, 1896. (Crandall and Cowen, no. 240.)

Perithecia erumpent, conic-globose, 110–140μ diam., coarsely cellular, perforated above, membranous; sporules oblong-elliptical or subcubical, yellow-brown, 3-septate and muriform, 10–20×8–12μ, mostly on blackened areas of the stem.

Septoria Jussiaeae E. & E.

Spots white with a red-shaded border, suborbicular, small (1–1¼ mm.); perithecia few (1–6) on a spot, oftener only a single one and that in the center of the spot, punctiform, black, epiphyllous, semierumpent; sporules filiform, curved, nucleate-septulate, 30–50×1–1¼μ.

On leaves of *Jussiaea pilosa*, Florida. (Geo. V. Nash, no. 2402.)

Septoria Ulmi E. & E.

On leaves of *Ulmus fulva*, Canada (Dearness), and on *Ulmus rhombifolia*, California (Hansen).

Spots orbicular, light yellow ⅓–1 mm. diam. Perithecia minute, collected in the center of the spot; sporules lunate, 3-septate, 20–30×2μ.

Septoria sigmoidea E. & E.

On leaves and sheaths of *Panicum virgatum*, Ames, Iowa, Oct., 1895. Coll. Geo. W. Carver, comm. L. W. Pammel.

Spots none. Perithecia covered, evenly scattered or subseriate, 80–110μ, lying between the nerves of the leaf and visible as minute black specks through the epidermis which is only very

slightly raised; sporules arcuate-fusoid or sigmoid, 3–6 (mostly 5-) septate, sometimes distinctly, but for the most part only slightly constricted at the septa, 35–52μ long, 4½–5½ thick in the middle, tapering to each end, often bent in the form of the letter S.

Comes near *S. epigeios* Thum. but has sporules more strongly curved, broader and tapering to each end.

Septoria Myricae E. & E.

On leaves of *Myrica* Newfield, N. J., Sept., 1895.

Hypophyllous. Spots rusty-brown, 3–6 mm. diam., often interruptedly confluent over the entire leaf, giving it a mottled appearance; spots sometimes subconcentrically marked; perithecia subcuticular, then erumpent, black, conical, with a broad opening at the apex; sporules bacillary, hyaline, continuous, 8–10×1¼μ.

MELANCONIEAE.

Melanconium arundinaceum E. & E.

On dead canes of *Arundinaria*, St. Martinville, La., March, 1896. (Langlois, no. 2444.)

Acervuli gregarious, elliptical, 1–1¾×¾–1 mm, lenticular, covered by the lead-colored epidermis, which finally splits along the middle; conidia globose, 15–20μ diam., or elliptical, 18–22× 13–16μ; basidia inconspicuous, shorter than the spores.

Differs from *M. hysterinum* Sacc. in its larger acervuli, and mostly obovate-elliptical conidia and inconspicuous basidia.

Myxosporium Corni E. & E.

On bark of dead *Cornus florida*, near Mich. Ag. College, Jan., 1892. (G. H. Hicks, no. 154.)

Acervuli subcuticular, convex-discoid, slate-color within, 1–1½ mm. diam., slightly raising and splitting the epidermis; sporules oblong, hyaline, 2-nucleate, 6–8×3μ, expelled in a flesh-colored globule.

M. nitida B. & C., has acervuli and sporules smaller.

Gloeosporium Senecionis E. & E.

On leaves of *Senecio aronicoides*, Wawona, Calif., June, 1895. (Davis, no. 9513.)

Spots orbicular, 5–10 mm. diam., often confluent over the greater part of the leaf, mostly darker around the margin but becoming a uniform light yellow; acervuli more abundant below,

yellow, about 75μ diam.; conidia oblong, 12–23×3–3½μ, slightly curved and obtusely pointed at the ends, continuous.

This can hardly be *Cylindrosporium Senecionis* B. and Br. Ann. Nat. Hist. no. 1613; Grev. 5: 58, which "forms white conspicuous patches," with flexuous flocci and cylindrical spores and belongs apparently among the Mucedineae.

On the California specimens are also small superficial perforated perithecia, on a mycelium like that of the Erysipheae. (*Asteroma Senecionis* E. & E.)

CYLINDROSPORIUM KELLOGGII E. & E.

On living leaves of *Quercus Kelloggii* Amador Co., Calif. (Hansen, no. 1357.)

Spots numerous, small (1–2 mm.) very dark brown at first, more or less whitening out in the center with a dark narrow margin, often confluent, forming irregularly shaped light brown dead areas ½–1 cm. or more in extent; acervuli hypophyllous, 110–150μ diam., erumpent in flesh-colored conglutinated heaps becoming nearly black; conidia cylindrical, more or less bent, nucleate, becoming about 3-septate, 40–65×2½–3μ.

CYLINDROSPORIUM LUPINI E. & E.

On leaves of *Lupinus cytisoides* and *L. latifolius*, Yosemite, Calif., June, 1895. (Davis, no. 9514.)

Spots irregular, suborbicular, 2–4 mm. or often extending along the side of the leaf or occupying the upper part of the leaf, dull reddish brown; acervuli amphigenous, pale, about 75μ diam.; conidia fusoid-filiform or spiculiform, nucleate, straight, continuous, 15–23×1¼–1½μ.

Differs from *C. longispora* Ell. & Dearness, in its larger spores and much shorter continuous conidia.

MARSONIA BAPTISIAE E. & E.

On leaves of *Baptisia leucantha*, Ames, Iowa, Oct., 1895. (Coll. Geo. W. Carver, comm. Prof. L. H. Pammell.)

Spots orbicular, 2–4 mm. diam., yellowish brown, with a broad almost black border, zonate; acervuli 150–200μ diameter, covered above by the blackened cuticle, finally erumpent; conidia oblong-elliptical, obtusely rounded at the ends, 14–18×6–7μ, continuous at first, becoming faintly uniseptate and mostly slightly constricted at the septum.

CORYNEUM PEZIZOIDES E. & E.

On rough outer bark of willow, Golden, Colorado, March, 1897. (E. Bethel, no. 213.)

Acervuli erumpent-superficial, at first punctiform, then orbicular, ⅓–½ mm. diam., black, mostly plane or slightly concave above, with the surface roughened as if by minute projecting ostiola; conidia oblong, 3-septate, constricted at the septa, olive-brown, 20–25×6–7μ, on basidia about 15μ long.

CORYNEUM NEGUNDINIS E. & E.

On dead limbs of *Negundo aceroides*, Denver, Colo., March, 1897. (E. Bethel.)

Acerculi subepidermal, at first separate, soon confluent and throwing off the epidermis, exposing a black continuous uneven layer seated on the inner bark; conidia obovate or elliptical, 2-septate, constricted at the septa or quite as often not constricted, yellow-brown, 20–30 exceptionally 40×12–15μ, on stout (15–20 ×4–5μ), subhyaline, subtorulose, continuous or faintly septate basidia.

The absence of erect sterile hyphae separates this from *Septosporium*, which, in the mature effused state, it much resembles.

HOMOSTEGIA DIPLOCARPA E. & E. Bull. Torr. Club, **24**: 135. 1897.

This should be *Phyllachora diplocarpa*, under which name it was distributed in N. A. F. 3439 & F. Col. 955. The 3-septate spores mentioned being only stylospores could not enable this to rank as *Homostegia*. The stroma too is like that of *Phyllachora*.

Rarities from Montana.—III.

BY P. A. RYDBERG.

PEDICULARIS MONTANENSIS.

Stem 3–4 m. high, simple, rather slender, more or less tinged with dark purple, glabrous; leaves pinnate, glabrous; segments ½–1 inch long, lanceolate, doubly serrate; spike short and dense, 3–6 cm., seldom 8 or 9 cm. long; bracts ovate, acuminate, about half as long as the flower, puberulent and villous-ciliolate and more or less purple-tinged as well as the calyx; calyx-lobes subulate; corolla 1.5 cm. long, purplish except a part of the lip which is yellow; galea much longer than the lip, lower portion straight, the apex cucullate and the tip not rostrate; lip 3-cleft, lateral lobes rounded and broad, middle one generally truncate and ciliolate at the margin.

A very near relative of *P. bracteata*, and perhaps only a variety thereof. The habit and form of the leaves are the same, except that *P. Montanensis* is a much more slender plant and has a shorter spike. In *P. bracteosa* the spike is often 2–3 dm. long, the bracts, especially the lower, fully as long as the light yellow corolla, the lateral lobes of lip are smaller.

Type: J. H. Flodman, no. 796, from Little Belt Mountains, nine miles from Barker, August 18, 1896.

PEDICULARIS CTENOPHORA.

Stem from a thickened caudex, about 3 dm. high, glabrous, strict, striate; leaves numerous, especially at the base, glabrous, rather thickish, pinnately divided into linear-lanceolate serrate segments; spike about 1 dm. long, rather loose; bracts broadly ovate in outline, pectinately divided; calyx gibbous above, purple-striate, more or less villous-ciliate at the base; corolla purplish; galea arcuate, produced into an elongated incurved beak; lip very broad, especially the lateral lobes.

It is a near relative of *P. contorta*, from which it differs in the color of the flowers, the more gibbous and purple-striate calyx, its hairiness at the base and the much larger and broader bracts.

Type: Rydberg, no. 2789, collected on the side of a snowclad mountain, near Lima, Montana, July 29, 1895.

GILIA CEPHALOIDEA n. sp.

G. spicata var. *capitata* Gray, Syn. Fl. 2; part 1, 144, 1886 (in part): not Proc. Am. Acad. 8: 274, 1870, nor *G. capitata* Sims, Bot. Mag. 53: *pl. 2698*. 1826.

Jenney's plant collected in the Black Hills of South Dakota was included by Gray in the Synoptical Flora in *G. spicata capitata*. It is however scarcely the same as Hall & Harbour's no. 461, the type of the variety. The species, represented by Jenney's plant, my own no. 886, collected 1892, in the same region and no. 2764 collected near Lima, Mont., in 1895, differs from *Gilia spicata* not only in the subcapitate inflorescence, but also in the form and color of the flower. In *G. spicata* the corolla is greenish or dull white, has a tube which is fully twice as long as the calyx, and oblong segments that are only one-third the length of the tube. In *G. cephaloidea* the corolla is pure white, tube only ⅓ or ½ longer than the calyx and the segments elliptical and about

half as long as the tube. The leaves are fully as much divided as in the former, but the plant is more woolly.

LAPPULA AMERICANA (Gray).

Echinospermum deflexum var. *Americanum* Gray, Proc. Am. Acad. 17: 224.

I think this is quite distinct from the European *L. deflexa*. The species of the Mississippi Valley and westward is a much larger plant, with a many-flowered divergently paniculate-branched inflorescence and broadly oblanceolate leaves. The European *L. deflexa* has almost linear leaves. *L. Americana* was collected by the author at Deer Lodge, Mont., in 1895 (no. 2775), a point much further west than the supposed range of the species.

ERIGERON OBLANCEOLATUS.

Stem from an apparently biennial root, 3–5 dm. high, striate, finely strigose, branched above; basal and lower leaves oblanceolate, tapering into a winged petiole, pointed, the margins ciliolate and with a few small but sharp teeth; stem-leaves linear, diminishing upward, the uppermost bract-like; heads 1–3, comparatively large, 15–25 mm. in diameter and about 10 mm. high; bracts 40–50, narrowly linear, acuminate, strigose; rays numerous, generally about 100, very narrow.

In the size and form of the head and bracts it most resembles *E. speciosus* and *E. subtrinervis*. In general habit it resembles somewhat *E. glabellus* Nutt., but differs by the much larger heads, the toothing of the lower leaves and the weak root system, which indicates a biennial, or a perennial by biennial offsets (the specimens show no stolons). In the latter case the plant should be placed nearest *E. Philadelphicus*, from which it is easily distinguished by the thin narrow leaves, the form and size of their teeth and by the few and larger heads.

Montana: Deer Lodge, July 10, 1895; collected by the author, no. 2822; Helena, June, 1889, by F. D. Kelsey.

ERIGERON ASPERUGINEUS (D. C. Eaton) Gray, Proc. Am. Acad. 16: 91. 1882.

Aster asperugineus D. C. Eaton, Bot. King's Exp. 142. 1871.

This species was collected at Melrose, Mont., July 6, 1895, no. 2823.

ERIGERON SUBCANESCENS.

Diplopappus canescens Hook. Fl. Bor. Am. 2: 21. 1834.

Erigeron canescens T. & G. Fl. N. Am. 2: 179. 1841–2. Not Willd.

This was included in *E. caespitosum* Nutt. by Dr. Gray, but I believe it to be a fairly good species, differing by the more slender and erect stems, the longer and narrower leaves, finer pubescence, smaller heads and narrower bracts.

It was collected by Flodman in the Spanish Basin, July 22, 1896, no. 836.

ERIGERON ANGUSTIFOLIUS (Gray).

Aster salsuginosus var. *angustifolius* Gray, Bot. Calif. 1: 325. 1876.

E. salsuginosus var. *angustifolius* Gray, Proc. Am.Acad. 16: 93. 1880.

From the field observations of Mr. Flodman and myself, I judge this to be as good a species as most of the group. It was collected by Flodman near the Little Belt Pass, Aug. 10, 1896, altitude 7000 ft., no. 854.

ERIGERON MINOR (Hook).

E. glabratus var. *minor* Hook. Fl. Bor. Am. 2: 18. 1834.

E. armeriaefolius Gray, Proc. Am. Acad. 8: 648. In part. 1870. Not Turcz.

Gray includes in *E. armeriaefolius* two distinct American plants. Neither agrees with the original description. One of these is Hooker's *E. glabratus minor*, the other his *E. lonchophyllus*. A duplicate of the type of the former is in the Columbia herbarium. There are also the following specimens of the same plant:

Oregon: T. J. Howell, no. 3884. 1884.

Montana: J. H. Flodman, no. 839, 1896; P. A. Rydberg, no. 2824. 1895.

Northwest Territory: John Macoun. 1879.

South Dakota (Black Hills): P. A. Rydberg, no. 786. 1892.

Colorado: M. E. Jones, no. 471. 1878.

All these specimens differ from those cited under the following species in the following respects: The stem is low, 1–2 dm. high, very leafy; basal leaves numerous, the lowest spatulate; stem leaves linear, without petioles, ciliate at the base; inflorescence racemose, with heads on very short pedicels.

ERIGERON LONCHOPHYELLUS Hook. Fl. Bor. Am. 2: 18. 1834. *E. armeriaefolius* Gray, l. c., in part. Not Turcz.

This is generally 3–6 dm. high; leaves rather scattered; basal leaves rather few and oblanceolate; stem leaves, except the uppermost, with distinct petioles; inflorescence more irregular and heads generally on elongated pedicels. The following specimens are in the Columbia Herbarium:

Utah: E. Palmer, no. 221. 1877. M. E. Jones, no. 1859. 1880.

Nevada: S. Watson, no. 536. 1868.

Montana: Rydberg, no. 2825. 1895.

ERIGERON MONTANENSIS n.n.

E. Tweedyana Canby & Rose, Bot. Gaz. 15: 65. 1890. Not *E. Tweedyi* Canby, Bot. Gaz. 13: 17. 1888.

This species has been collected again in Montana by J. H. Flodman, at the following stations: Elk Mountains, no. 837; Little Belt Mountains, near the Pass, no. 838.

ARTEMISIA GRAVEOLENS.

Perennial, somewhat woody at the base, with numerous simple branches, these strict and striate, glabrous; leaves twice or thrice pinnately dissected into narrow divisions, glabrous, or finely grayish pubescent beneath; heads in a narrow strict panicle, distinctly pedicelled, about 4 mm. in diameter; bracts ovate, glabrous, with a brownish scarious margin; flowers brown; whole plant heavy-scented and covered with glutinous dots.

It comes nearest to *A. discolor*, from which it differs in being almost glabrous, the pedicelled, not nodding heads, and the heavy scent.

Type: J. H. Flodman, no. 881, from Long Baldy in the Little Belt Mountains, Aug. 19, 1896. Also collected by Frank Tweedy, no. 310, in Park county, 1887.

ARTEMISIA CANDICANS.

Stem stout, nearly 1 m. high, tomentose, branched; leaves pinnately or twice pinnately divided into oblong segments, tomentose on both sides, grayish above, white beneath; heads sessile in clusters in a compound interrupted spike, 5–8 mm. in diameter; bracts oval, scarious-margined and tomentose.

It somewhat resembles *A. Tilesii elatior* T. & G. in habit but

differs in the leaves, which are tomentose on both sides and have shorter not acuminate segments, and in the somewhat larger, strictly sessile heads with tomentose bracts.

Type: J. H. Flodman, no. 882, 1896, from Little Belt Mountains.

ARTEMISIA FLOCCOSA.

Stem stout, 5–7 dm. high, striate, tomentose; leaves pinnately divided into oblong segments, loosely white-tomentose on both sides; heads 5–6 mm. in diameter, erect, evidently pedicelled, in an elongated narrow raceme or panicle; bracts oval, scarious-margined and tomentose.

It is nearly related to the preceding, differing mainly in the looser tomentum, and the erect pedicelled slightly smaller heads. From *A. Tilesii elatior* it differs in the tomentum, the form of the leaves, and the erect heads with tomentose bracts.

Type: P. A. Rydberg, no. 2942, Lima, Aug. 6, 1895.

ARNICA FULGENS Pursh, Fl. Am. Sept. 2: 527. 1814.

I think that this is distinct from *A. alpina*, differing in the following characters: taller, stem often 3–4 dm. high, shorter pubescence, often 3 or 4 smaller heads, much broader and dentate leaves and often as many as many as 3 or 4 pairs of stem leaves.

It was collected by Mr. Flodman at Little Belt Pass, no. 891. 1896. My own specimens, no. 823, from the Black Hills, also belong here.

ARNICA GRACILIS.

Stem slender, 1–2 dm. high; whole plant glabrous, except a little glandular puberulence on the pedicels and involucre; basal leaves broadly ovate, petioled, dentate, 3-ribbed; stem leaves about 2 pairs, similar, the upper sessile; heads 1–3; disk 10–15 mm. high; bracts 12–15, oblong-lanceolate, acuminate; rays about 15 mm. long; achene almost glabrous.

It much resembles the preceding and may perhaps be a form of it, but differs by the smaller heads, the glandular-puberulent involucre and pedicels and the glabrous foliage and stem. It approaches depauperate forms of *A. latifolia*.

Type: J. H. Flodman, no. 901, 1896, from the Spanish Peaks.

ARNICA PEDUNCULATA.

Stem 3–6 dm. high, finely villous-pubescent, striate; basal leaves broadly oblong to almost linear, entire, 3-ribbed, tapering into a more or less winged petiole; stem leaves about 2 pairs,

similar, but narrower and sessile; head on a peduncle that is often 2–2½ dm. long; bracts 18–20, linear or lanceolate, acute but not acuminate, villous-pubescent: disk 15–18 mm. high; rays fully 1½ cm. long, orange; achenes hirsute, pubescent.

It is somewhat between *A. foliosa incana* and *A. alpina* in habit, but differs from both by the long-peduncled solitary head and finer pubescence. It was collected by J. H. Flodman in the Spanish Basin, July 11, no. 899 (broad leaved) and July 10, no. 900 (narrow leaved), 1896. Also collected in Idaho by A. A. & Gertrude Heller, no. 3293, 1896, and in Washington during the Wilkes expedition.

SENECIO SALIENS.

S. triangularis β T. N. G. F: Am. 2 & l. 441. 1834.

Periennial from a thick rootstock and numerous matted roots; stem stout, 3–5 dm. high, glabrous, striate; leaves fleshy, deltoid-triangular, with salient teeth, the lower petioled, the upper sessile; inflorescence short, corymbose; heads about 1 cm. high; bracts linear; rays about 8 mm. long; achenes glabrous.

It is nearest related to *S. triangularis*, differing in the lower stature, the smaller thick and rather fleshy leaves, with fewer coarser less pointed teeth. The following specimens belong to it:

Montana: J. H. Flodman, no. 919, 1896, from Y>go Baldy in the Little Belt Mountains, altitude 7000 feet.

Wyoming: Fremont, in the Wind River Mountains, altitude 7000 feet.

Washington: Frank Tweedy, 1883, Yakima Region, altitude, 6700 feet.

SENECIO PSEUDAUREUS.

Perennial from a creeping rootstock; plant perfectly glabrous except the tips of the bracts; stem 5–8 dm. high; basal leaves broadly ovate, somewhat cordate at the base, serrate, 4–7 cm. long, long-petioled; stem leaves more or less laciniate at the base, the upper sessile; inflorescence corymbose, flat-topped, of 8–10 heads about 8 mm. high; bracts linear; rays orange, about 8 mm. long.

It most resembles *S. aureus* and represents it in the Rockies. It has the same large basal leaves as that species, but they are less cordate at the base, not quite as wide and serrate instead of crenate. *S. aureus* is a strictly Eastern species.

Montana: J. H. Flodman, no. 918, from Little Belt Moun-

tains (type), and 918½ from Spanish Basin, 1896; Frank Tweedy, no. 340, Park county, 1887.

Nevada: S. Watson, no. 667, 1868.

SENECIO CROCATUS.

S. aureus var. *croceus* Gray, Proc. Acad. Phila. **1863**: 68. 1863.
Not *S. croceus* DC.

This is well distinct from both the preceding and from *S. aureus*, differing in its smaller oval or obovate, coarsely and bluntly dentate, somewhat fleshy basal leaves. It represents *S. obovatus* of the East. It was collected in Montana by Mr. Flodman in the Little Belt Mountains, near the pass, no. 911.

CREPIS RUNCINATA ALPICOLA.

Stem scapose, about 1 dm. high, generally only 1-flowered; leaves entire, or with a few small teeth, and with very short petioles.

In habit it is very unlike the typical *C. runcinata*, but I have been unable to find any essential characters in the heads, involucre, pappus or achenes, by which to separate it as a species. The short 1-flowered stem, smaller and more entire leaves may be due to the high altitude, 7000 feet, at which it grew.

Type: Flodman, no 931, August 24, 1896, from Yogo Baldy, Little Belt Mountains.

Antennaria dioica and its North American Allies.

BY P. A. RYDBERG.

In 1892 when I began to determine my Black Hills collection, I felt that there must be something wrong in the genus *Antennaria*, especially in the group of which *A. dioica* is the representative species. My studies then, my field work in 1895 and 1896, and Mr. Flodman's collection have made it possible I think to remove at least a part of the difficulty. What have been named in our herbaria *A. dioica* and *A. alpina* constitute not less than six distinct species. I suspected that *A. plantaginifolia* contains more than one species, but have not been able to satisfactorily solve the problem. This seems to have been done by Prof. E. L. Greene in a recent

number of "Pittonia"; I shall, however, add a description of the prairie plant of Nebraska, Kansas and Dakota, referred to in Prof. Greene's paper. As far as I know the species at present, I shall arrange them as follows:

Heads sessile at the ends of short leafy branches resembling the stolons. *A. rosulata.*

Heads in cymose or subcapitate clusters, or solitary on evident erect stems.

Basal leaves and those of the stolons narrowly oblanceolate; bracts generally rose-color. *A. parvifolia.*

Basal leaves and those of the stolons spatulate or obovate.

Basal leaves .5–4 cm. long and less than 1.5 cm. wide, one-ribbed or indistinctly three-ribbed.

Heads 5–7 mm. high.

Plants less than 1.5 dm. high; heads in subcapitate clusters.

Bracts of the pistillate plant dark greenish brown, acute or acuminate. *A. alpina.*

Bracts of the pistillate plant umber, obtuse. *A. umbrinella.*

Plants generally over 2 dm. high; heads in an open cyme.

Basal leaves ½–1 cm. long; stem leaves linear. *A. microphylla.*

Basal leaves 2–3 cm. long; stem leaves spatulate, broadly oblong and ovate-lanceolate. *A. pedicellata.*

Heads about 1 cm. high.

Basal leaves broadly spatulate, with a distinct petiole, generally tomentose on both sides; bracts of pistillate plant obtuse, or the innermost seldom acute. *A. dioica.*

Basal leaves more glabrate above, without distinct petiole; bracts of pistillate plant acute or acuminate, or the outermost obtuse.

Stem slender, 2–3 dm. high; stolons very long; basal leaves narrowly cuneate. *A. neglecta.*

Stem stout, short, about 1 dm. high; stolons short; basal leaves obovate. *A. campestris.*

Basal leaves over 4 cm. long and 1.5 cm. wide, prominently 3 ribbed.

Heads cymose; bracts of pistillate plant lanceolate.

Basal leaves broadly cuneate without distinct petiole. *A. Howellii.*

Basal leaves oval with a distinct petiole. *A. plantaginifolia.*

Head solitary; bracts of pistillate plant almost linear. *A. solitaria.*

Heads racemose or paniculate. *A. racemosa.*

Antennaria rosulata.

Antennaria dioica var. *congesta* Gray, Syn. Fl. 1: pt. 2, 233. At least in part. 1884. Not DC.

The two sheets of the American plant found in the Columbia University herbarium differ considerably from European specimens in the same herbarium. The European is evidently a depauperate form of *A. dioica* or at least nearly related to it. The American plant, besides having a more trailing habit, possesses an almost turbinate involucre, of which only the innermost row of bracts have a broadly oblong obtuse papery appendage; the outer ones are even destitute of scarious margins. The whole involucre is densely white tomentose. Specimens seen: E. A. Mearns, no. 40, 1887, from the Mogollon Mountains, Arizona; E. Palmer, no. 109, 1869.

ANTENNARIA PARVIFOLIA Nutt. Trans. Am. Phil. Soc. 7: 406.

A. dioica var. *rosea* D. C. Eaton, Bot. King's Exped. 186. Name only. 1871.

Stems very slender, 1½–3 dm. high; pubescence of the whole plant fine, silky and somewhat yellowish; leaves of the stolons narrowly oblanceolate, 2–3 cm. long; stem leaves linear; heads small, 5–7 mm. high, in a contracted almost capitate cyme; bracts of both staminate and pistillate heads in several rows, yellowish, the scarious portion oblong, obtuse, nearly always tinged with rose or pink.

It is nearest related to *A. dioica*, differing in the slender habit, small heads, narrow leaves and the color of the plant and bracts; the staminate plant is very rare. The following specimens are in the Columbia herbarium:

California: Mrs. R. M. Austin, 1894; J. Torrey, no. 256, 1865.

Oregon: Wilkes expedition.

Washington: W. N. Suksdorf, no. 2190, 1892.

Idaho: A. A. & Gertrude Heller, no. 3441, 1896.

Nevada: S. Watson, no. 652, 1868.

Utah: M. E. Jones, no. 1390, 1879.

Colorado: Parry; F. N. Pease; Dr. E. Penard, nos. 282 and 284, 1891.

South Dakota (Black Hills): P. A. Rydberg, no. 79, 1892.

Montana: J. H. Flodman, no. 863, 1896.

Vancouver Island: John Macoun, 1887.

Subarctic America: R. Kennicott, 1861–62.

ANTENNARIA ALPINA (L.) Gaertn. Fr. & Sem. 2: 410. 1791.
Gnaphalium alpinum L. Sp. Pl. 856. 1753.

A. alpina is characterized by the bracts of the pistillate head, which are dark greenish brown, lanceolate and acute. The staminate plant is exceedingly rare; in the Columbia herbarium there are only three small plants, two, both monocephalous, collected by M. W. Harrington in Alaska, and the third received from Dr. Hooker, without any reference to locality or collector.

A. alpina has been collected in Montana by J. H. Flodman on Yogo Baldy, August 24, 1896, no. 861; Long Baldy, August 19, no. 862, and by Frank Tweedy in the Bozeman Pass, 1883.

ANTENNARIA UMBRINELLA n. sp.

Stem generally about 1 dm. high; leaves of the stolons spatulate, 1–1.5 cm. long, those of the stem linear-oblong; heads small, about .5 cm. high, conglomerated in small subcapitate clusters; scarious portion of the bracts in the pistillate head oblong, obtuse, in the outer varying from umber to isabel-colored, in the inner lighter colored and sometimes almost white; in the staminate heads all elliptic, obtuse and isabel-colored or yellowish white.

In habit it much resembles *A. alpina*, from which it differs by the oblong obtuse bracts of the pistillate plants and somewhat smaller heads. The staminate plants of the two species are almost identical in every respect except that the bracts are of slightly lighter color in *A. umbrinella*. I describe this species as new, with some hesitation, not that I have any doubt concerning its distinctness from *A. alpina* and our North American species, but it is so closely similar to *A. Magellanica* Sch. Bip.* that if it were not for the great distance between their ranges and for the slightly longer leaves and more slender caudex of the latter, I would regard the two as one species. The staminate plants are nearly as common as the pistillate ones. The following specimens are in the Columbia herbarium:

Montana: J. H. Flodman, no. 859, August 19, 1896, from Long Baldy in the Little Belt Mountains (type) and no. 860, July 18, from Spanish Basin.

Wyoming: Aven Nelson, no. 885, 1894 (labelled *A. dioica*).

Nevada: S. Watson, no. 650 (*A. alpina*) and 651, 1868.

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* Flora 38: 117. 1855.

Idaho: I. Mulford, 1892 (*A. dioica*).
Oregon: Wilkes Expedition (*A. dioica*).
Arctic America: Dr. Richardson, 301 (*Gnaphalium dioicum*).

ANTENNARIA MICROPHYLLA.

Stem slender, strict, 2–3 dm. high; pubescence very fine; leaves of the stolons small, .5–1 cm. long, spatulate; stem-leaves linear-oblong; heads small, 5–7 mm. high, in a rather open corymb; bracts of the pistillate heads tinged with greenish yellow, linear-oblong or lanceolate, mostly acute, those of the staminate head with oval-oblong white scarious margins.

In the characters of the head and bracts, it is intermediate between *A. alpina* and *A. plantaginifolia*. The head is scarcely as large as that of the former, the stem is much more slender than in either and the leaves smaller than in any of the group. It has been variously labelled in collections as *A. dioica*, *A. luzuloides*, *A. Carpatica*, etc. The following specimens are in the Columbia herbarium:

Montana: P. A. Rydberg, no. 2831, 1895, from Manhattan (type); J. H. Flodman, no. 864, 1896, from Bozeman.
Yellowstone National Park: Frank Tweedy, no. 203, 1884; A. Brown, 1893.
Wyoming: Fremont; A. Nelson, no. 762.
Colorado: C. C. Parry, 1872; Letterman, no. 200, 1884.
Utah: S. Watson, no. 651, 1869.
Saskatchewan: E. Bourgeau, 1858.

ANTENNARIA PEDICELLATA Greene, Pittonia, 3: 175. 1897.

Specimens of what I take to be this species were collected by Mr. Flodman in the Little Belt Mountains, Mont., in 1896, no. 867. These have large stem leaves about 3 cm. long and 1 cm. wide; the lower ones are cuneate, obtuse, the middle ones broadly oblong and the upper ones ovate-lanceolate and acute.

ANTENNARIA DIOICA (L.) Gaertn., Fruct. & Sem. 2: 410. 1791.

Gnaphalium dioicum L. Sp. Pl. 856. 1753.

In the American specimens seen the stem is seldom 1.5 dm. high, rather stout, with larger heads often over 1 dm. high, the scarious portion in the staminate heads elliptic, in the pistillate oblong and obtuse, or the innermost rarely acutish, and the leaves of

the stolons broadly spatulate, or obovate, about 2 cm. long. In America it ranges from the Arctic regions to New Mexico and Arizona, and is the most common species in Montana.

For ANTENNARIA NEGLECTA Greene, A. PLANTAGINIFOLIA (L.) Hook. and A. HOWELLII Greene, see Prof. E. L. Greene's descriptions in Pittonia, 3: 173–4.

ANTENNARIA CAMPESTRIS n. sp.

Stem low, about 1 dm. high; basal leaves obovate-cuneate, 2–3 cm. long and about 1 cm. wide, without a distinct petiole, 1-ribbed or indistinctly 3-ribbed, the upper surface glabrate in age; stolons very short; pistillate heads about 1 cm. high, bracts lanceolate. the lower portion greenish, the upper brownish and ending in a scarious white acute or acuminate tip; staminate heads somewhat smaller; the white scarious tips of the bracts elliptical and obtuse.

It is nearest related to *A. neglecta* Greene, from which it differs mainly in the low habit, broader basal leaves, and short stolons. It is confined to the prairies and plains west of the Mississippi.

Nebraska: H. J. Webber, 1887; G. D. Swezey; J. M. Bates, 1891; P. A. Rydberg.

South Dakota: P. A. Rydberg, no. 794, 1892 (Black Hills).

Saskatchewan: Dr. Richardson.

ANTENNARIA SOLITARIA n. n.

Gnaphalium monocephalum Carpenter, in Torr. & Gray, Fl. N. Am. 2: 431. 1843.

Antennaria plantaginifolia monocephala Torr. & Gray, l. c.

Antennaria monocephala Greene, Pittonia, 3: 176, 1896. Not DC. Prod. 6: 269. 1837.

To the characters given by Prof. Greene, may be added the exceedingly narrow bracts of the pistillate head.

Studies in the Asclepiadaceae.—I.

By Anna Murray Vail.

NOTES ON THE GENUS PHILIBERTELLA IN THE UNITED STATES.

PHILIBERTELLA.

[Sarcostemma H.B.K. Nov. Gen. et Sp. 3: 193. 1818. As to the three species described and not R. Br. 1809.]

[Ceramanthus (subgenus) Kunze, Linnaea, 20: 26. 1847. Not Hassk. 1844.]

[Philibertia Benth. and Hook. Gen. Pl. 2: Part 2, 750. In part, 1876. Not H.B.K. 1818.]

[Philibertia A. Gray, Proc. Am. Acad. 12: 64. 1876. Not H.B.K. 1818.]

The genus *Philibertia*, dedicated to J. C. Philibert, author of some French elementary botanical works, was established in H.B.K. Nov. Gen. et Sp. 3: 195. *pl. 230*, and founded on one species, *Philibertia solanoides*, from Tomependa on the Amazon river, a species reduced by K. Schumann in Engler and Prantl, Nat. Pfl. Fam. 1895, to the genus *Oxystelma* R. Br. 1809 where it seems rightfully to belong.

Most of the North American species have been originally described by various authors under *Sarcostemma* and were reduced by Dr. Asa Gray to *Philibertia* in 1876. *Sarcostemma* is a genus with leafless jointed stems, and as far as is known does not occur on the American continent, those of the South American species described under that genus belonging either to *Philibertella* or to *Oxystelma*.

The genus *Philibertella* is here accepted as described under *Philibertia* by K. Schumann in Engler and Prantl, Nat. Pfl. 4: 229, 1895, as follows:

Calyx small, 5-parted, the lobes acute; corolla campanulate or rotate, deeply 5-parted, the lobes acute or obtuse, with a shallow entire or undulate ring forming an outer crown in its throat, the inner or stamineal crown consisting of five turgid fleshy or hard scales, or flattish appendages, attached in a circle at the base of the

sessile or slightly stalked gynostegium (column), forming a hollow entire or undulate spreading surface near the level of the conical stigmas; follicles naked, slender, attenuate at both ends or obtuse at the base.

Twining herbs, or partly shrubby plants, of warm regions, with opposite glabrous pubescent or woolly leaves and umbellate sometimes fragrant and showy flowers. Some thirty species are known from North and South America, according to Schumann, extending from southern Utah to South Brazil and Argentina.

The following species occur within the limits of the United States:

PHILIBERTELLA CLAUSA (Jacq.).

Cynauchum clausum Jacq. Select. Am. 1: 87. *pl. 60 f. 2.* 1763.

Asclepias viminalis Swartz, Prodr. 53. 1788.

Sarcostemma Brownii G. F. W. Meyer, Prim. Fl. Esseq. 139. 1818.

Sarcostemma clausum Roem. & Schult. Syst. Veg. 6: 114. 1820.

Sarcostemma crassifolium Chapm. Fl. 368. 1860. Not Decaisne, 1844.

Philibertia viminalis A. Gray, Proc. Am. Acad. 12: 64. 1876.

Very variable. Some of the narrower leaved forms are so close to *Philibertella crassifolia* (Decsne) and *Philibertella Cumanensis* (H.B.K.) as to possibly include them both. *Philibertella Palmeri* (A. Gray), another closely related species, may also, on further study of the Mexican species, prove to be a more pubescent and broader leaved form of *P. clausa.*

Original locality, Cartagena, Columbia.

Florida: Key West, Blodgett; Indian River, A. H. Curtiss, no. 2306, Palm Beach, Webber, no. 68.

Demerara: Jenman, no 4381.

New Granada: Holton, no. 458, 1853.

British Guiana: Jenman, no. 2025.

PHILIBERTELLA CRISPA (Benth.)

Sarcostemma crispum Benth. Pl. Hartw. 291. 1841.

Sarcostemma undulatum Torr. Bot. Mex. Bound. Surv. 161. 1859.

Sarcostemma heterophyllum var? Torr. Bot. Mex. Bound. Surv. 162. 1859.

Philibertia undulata A. Gray, Proc. Am. Acad. 12: 65. 1876.
Philibertia crispa Hemsley, Biol. Centr. Am. 2: 318. 1881.

Very variable as to the size and undulation of the leaves. No. 1326, collected by C. G. Pringle in Chihuahua, is undoubtedly this species, but there is scarcely any undulation on the leaf margin and no trace, except on a few young leaves, of the whitish midvein, so prominent on the Texan specimens. Wright, no. 1679, from New Mexico, also belongs here, though the gynostegium is somewhat more sessile than in most specimens. In the original description by Dr. Torrey of *Sarcostemma undulatum* there is reference to its similarity to *Sarcostemma crispum* Benth., doubting, however, its identity with that plant, owing to the latter being "a humble species only half a foot long, the peduncles barely equal the petioles;" but as specimens of *S. undulatum* have since been collected (Austin, Texas, E. Hall, 1872, no. 518, in U. S. Nat. Herb.) which measure only 12 cm. in length, and others again with very short petioles and peduncles, there is little doubt that this is the species described by Bentham, of which only one original specimen is known. In other respects the description of *S. crispum* is that of *S. undulatum* in every detail except as regards some of the larger leaved Texan specimens.

Original locality, Aguas Calientes, Mexico. Type in Herb. Kew.

Texas: Tom Greene Co. Tweedy, 1879; Blanco, Wright, nos. 1678, 547, October, 1849; Mexican Bound. Surv. nos. 1066 and 1068; T. Havard, October, 1881; Dallas, Reverchon, 1881; Austin, Hall, no. 518.

New Mexico: Wright, no. 679.

Arizona: E. Palmer, 1869.

Mexico: C. G. Pringle, no. 1326, 1887.

PHILIBERTELLA CYNANCHOIDES (Decne.)

Sarcostemma cynanchoides Decne. in DC. Prodr. 8: 540. 1844.
Gonolobus viridiflora Torr. Ann. Lyc. N. Y. 2: 219. 1828. Not Nuttall, 1818.
Philibertia cynanchoides A. Gray, Proc. Am. Acad. 12: 64. 1876.
Philibertia viridiflora Britt. & Rusby, Trans. N. Y. Acad. Sci. 7: 11. 1887.

Original locality, Matamoros, Mexico.

Type in Herb. Mus. Par. Authentic specimens, Berlandier, no. 2334 in Herb. Columbia University.

Along rivers, southern Utah, New Mexico, Arizona and Texas to Guatemala.*

Arizona : Fort Verde, Mearns, no. 238.

New Mexico. Rusby, no. 261; Wright, no. 1680.

Texas : San Diego, Mary Croft, no. 70; Mexican Boundary Survey, below Presidio del Norte; Berlandier, no. 904.

Mexico : Berlandier, no. 2334; Thurber, no. 368, 1851; Paso del Norte, Chihuahua, no. 1324.

PHILIBERTELLA HARTWEGII.

Sarcostemma lineare Decne.; Benth. Pl. Hartw. 25. 1840. Not Sprengel, 1822.

Philibertia linearis A. Gray, Proc. Am. Acad. 12: 64. 1876.

Original locality, Leon, Mexico.

Type, Hartweg, no. 217.

Southern Arizona to Lower California and South Mexico.

Fremont's Expedition to California, 1849, without locality.

Southern California : Parry and Lemmon, no. 230. 1876.

Lower California : Lieut. Pond, 1889; Lagoon Head, Palmer, no. 814. 1889.

Mexico : Gregg, 1847; Sonora, Capt. Smith; Sonora, Thurber, 369, 1851.

PHILIBERTELLA HARTWEGII HETEROPHYLLA (Engelm).

Sarcostemma heterophylla Engelm., in Torr. Pac. R. R. Rep. 5 : Appendix, 362. 1856–57.

Philibertia linearis var. *heterophylla* A. Gray, Proc. Am. Acad. 12: 64. 1876.

Very variable. The broader leaved forms seem to approach the narrower-leaved specimens of *P. crispa*, but they are thinner and much shorter. The gynostegium seems to be invariably sessile or nearly so, and the lobes of the corolla are always acute.

Original locality, Fort Yuma, California. Type in Herb. Co.

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* A specimen of this species labelled *Gonolobus viridiflorum* Nutt., preserved in Herb. Columbia University is claimed to have been collected near St. Louis, Missouri, by Dr. Baldwin.

lumbia University. California to Arizona, New Mexico and Mexico.

New Mexico: Wright, no. 1681.

California: Fort Yuma, Major Thomas; Mexican Boundary Survey, San Luis Rey, 1850.

Lower California: Palmer, no. 5. 1887.

Mexico: Pringle, no. 1051.

PHILIBERTELLA HIRTELLA (A. Gray).

Sarcostemma lineare var. *hirtella* A. Gray, Bot. Calif. 1: 478. 1876.

Philibertia linearis var. *hirtella* A. Gray, Syn. Fl. 2: Part 1, 88. 1878.

Stems many, in clusters, mostly branched near the base, erect and twining above from a stout corky-barked decumbent? or prostrate? stem or rhizome; densely and softly cinereous-pubescent and pale gray-green throughout; leaves sessile, or very short petioled, 1–3.4 cm. long, narrowly linear, thickish, densely cinereous-pubescent on both surfaces; peduncles 1–4 cm. long, 8–12-flowered or more; pedicels 5–8 mm. long, slender; calyx-lobes lanceolate, acute; corolla 8–9 mm. broad, the lobes acutish, dull purple? with a scarious ciliate margin, unequally granulose above, cinereous-pubescent beneath; outer crown shallow, slightly undulate; scales of the stamineal crown flattened, acutish; follicles usually in pairs, conspicuously diverging, 5–5.5 cm. long, fusiform, long-attenuate at the apex, less so or obtuse at the base, densely cinereous-pubescent, 3–4 seeded, possibly more; seeds 7–8 mm. long, flat and thin, the margin slightly revolute, entire at the apex, strongly tuberculate on the inside and granulose on the outside; coma 2–2.5 cm. long. May.

Original locality, Sandy River, Fort Mohave, California.

Type in Herb. Harvard University.

Arizona: The Needles, Jones, no. 3815; Palmer, 1884.

California: Colorado River Valley, Palmer, no. 441, 1876; Willow Creek Cañon, Panamint Mountains, Coville and Funston, no. 817, 1891. Said to extend into Texas and Mexico.

PHILIBERTELLA TORREYI (A. Gray.)

Sarcostemma elegans? Torr. Mex. Bound. Surv. 161. 1859. Not Decne. 1844.

Philibertia Torreyi A. Gray, Proc. Am. Acad. 12: 64. 1876.

Apparently only collected once. Close to *Philibertella elegans* (Decne.); but differing in its slightly less acute corolla segments, and less conspicuous outer crown. The scales of the stamineal crown in *Philibertella elegans* are vertically flattened, acute and almost petaloid, whereas those of *P. Torreyi* are truncate, rounded or flat on top.

Original locality, Rocky Hills on the Cibolo, a tributary of the Rio Grande, southwest Texas.

Type in Herbarium, Columbia University.

The specimens examined for these notes are those contained in the Herbarium of Columbia University and the U. S. Nat. Herbarium at Washington.

Plants from Nez Perces County, Idaho.

By A. A. Heller.

(Plates 309, 310.)

Four months of the season of 1896 were spent in northern Idaho by Mrs. Heller and myself, during which time many interesting species were collected. Among these a dozen or more seem to be new, and have already been distributed as such, although not yet described. As soon as possible a complete report on the work will be published, with descriptions of the new species, and notes on all of the others. The following new and noteworthy species are discussed in this paper:

Poa scabrifolia n. n.

Poa filifolia Vasey, Cont. U. S. Nat. Herb. 1: 271. Not Schur.

The very appropriate name which Dr. Vasey gave to this beautiful species, is not tenable on account of the earlier *Poa filifolia*, published by Schur, in Enum. Pl. Transs. 768. 1866. It is plentiful at the type locality, on the left bank of the Clearwater river, near the Upper Ferry, east of Lewiston.

Ranunculus arcuatus n. n.

Ranunculus tenellus Nutt.; T. & G. Fl. N. A. 1: 230. 1838. Not Viviani.

Ranunculus Nelsonii var. *tenellus* A. Gray, Proc. Am. Acad. **8**: 374. 1872.

Ranunculus occidentalis var. *tenellus* A. Gray, Proc. Am. Acad. **21**: 373. 1886.

Ranunculus Nelsonii glabriusculus Holzinger, Cont. U. S. Nat. Herb. **3**: 210. 1895. Not *R. glabriusculus* Rupr.

Ranunculus Bongardi var. *tenellus* Greene, Erythea, **3**: 54. 1895.

A species which is abundant in moist or wet places in the Craig mountains. It was collected in two localities at Lake Waha, one at the head of the lake, and the other in the Sweetwater cañon. It was also noticed about Forest. In this connection it may be well to call attention to an unjust custom which botanists have fallen into. Professor Greene, in 1895, published *Ranunculus Bongardi* as a new species, and at the same time reduced to it as a variety the *Ranunculus tenellus* of Nuttall, published in 1838. In doing this he has merely followed a prevalent custom. Would it not be better if we, who are working for a stable nomenclature, would show more justice in such matters. If a new plant is discovered, do we have a right to describe it as a new species, while reducing to it as a variety, some plant described as a species years before? The proper way, as it appears to me, is to describe our own new plant as a variety of the old species, if we must describe varieties.

SOPHIA FILIPES (A. Gray).

Sisymbrium incisum β filipes A. Gray, Pl. Fend. 8. 1849.

Sisymbrium longipedicellatum Fourn. Sisymb. 59. 1865.

This species is very common about Lewiston, and at various other places in Nez Perces county. It bids fair to become a weed in wheat fields, as well as in grass lands. The type specimen was "from Clear Water, Oregon, by Mr. Spaulding," but that is a mistake, if the Clearwater river is meant, for the Clearwater empties into the Snake at Lewiston, and no part of it flows near the State of Oregon.

DODECATHEON PUBERULENTUM n. sp.

Crown 1–2 cm. long, covered with the petioles of fallen leaves, not producing bulblets; leaves spatulate or oblong-obovate, 5–6 cm. long, including a margined petiole of 2 cm., glabrous, light green, thin, but firm, entire or slightly crenate, somewhat pointed,

midvein prominent, yellowish; scape 2 dm. high, slender, tinged with purple, puberulent; umbel usually three-flowered, subtended by five narrowly lanceolate bracts 3–4 mm. long; pedicels 2–4 cm. long, slender, puberulent, the upper half somewhat striate; calyx puberulent, 5 mm. long, the five lanceolate lobes equalling or slightly exceeding the tube; corolla 1 cm. long, rose-purple, the everted tube marked with a bright band of yellow; stamens 5 mm. long, five in number; filaments 2 mm. long, bright yellow, the connectives lanceolate, half the length of the anthers, with yellow base and purple tip; style slender, 6 mm. long, hence longer than the stamens; capsule narrowly ovate-oblong, slightly longer than the calyx, tipped with a knob-like point, which splits into five segments. (Plate 309.)

The type is no. 2985, collected April 29, 1896, on the left bank of the Clearwater, near the Upper Ferry. It is not uncommon in that vicinity, growing on grassy hillsides. Some of no. 63, listed in Cont. U. S. Nat. Herb. 3: 239, as "Dodecatheon sp." was first collected here by the writer, but specimens from other places were later placed under the same number. It is related to *D. Cusickii* Greene, but pronounced distinct by Professor Greene. No. 3169, collected at Lake Waha June 3, 1896, and distributed as *D. puberulentum*, is probably *D. Cusickii*.

FRASERA FASTIGIATA (Pursh).

Swertia fastigiata Pursh, Fl. Am. Sept. 101. 1814.

Frasera thyrsiflora Hook. Kew. Journ. Bot. 3: 288. 1851.

The original locality of this species is given by Pursh as "on the Missouri flats, near the Rocky mountains. *M. Lewis* * * * * July." Dr. Gray, in the Synoptical Flora says: "Idaho and interior of Oregon, on the tributaries of the Columbia, *Lewis, Douglas, Geyer, Spaulding*. Rare and little known. Pursh's plant, seen in herb. Lambert, where the true station is recorded: 'in moist and wet places on the Quamash flats, June 4, 1806,' at which date Lewis and Clarke were on the Kooskooskie (now Salmon) river, near which the species was collected by Spaulding."

Dr. Gray's statement concerning the identity of the Indian name "Kooskooskie" is erroneous. The Clearwater, and not the Salmon, is known by that name. The "Quamash Flats," or "Camas Prairie," is near Mt. Idaho, on the South Fork of the Clearwater.

The species is common on the Craig Mountains, growing usually on grassy slopes or open glades, or along streams in mead-

ows, at elevations of 2000 to 3500 feet. It is also plentiful in meadows in the vicinity of Genesee and Moscow, Latah county.

It was collected at Lake Waha, near Moscow, by Sandberg, MacDougal and Heller, in 1892, while acting as field agents for the Department of Agriculture. It is their no. 239, erroneously determined by Mr. Holzinger as *Frasera speciosa* Dougl., a species which belongs to a different section and is easily separated from *F. fastigiata* by having the leaves in fours and sixes instead of threes, by their different shape, and by the more leafy stem.

THALESIA PURPUREA n. sp.

Rootstock stout, fascicled or sparingly branched, 5–6 cm. long; scales glabrous, broad, acute, prominently veined; scapes stout, 1–1.5 dm. long, channeled, glandular-pubescent, especially above; calyx equally 5-lobed, glandular-pubescent, prominently 3-nerved, the lateral nerves close to the margin, the lobes twice the length of the tube, long-acuminate from a triangular base, and reaching to the curve of the corolla; corolla deep violet-purple, 3 cm. long, curved near the middle, glandular-pubescent, lobes broadly oblong or obovate, usually notched or sometimes merely rounded, fringed with short, glandular hairs, marked with three yellowish veins; stamens smooth, the anthers obovate, short, acuminate at the base; style flat; stigma flat, broad, 2-lobed, the lobes obovate, somewhat granular-roughened; ovary glabrous. (Plate 310.)

The type is no. 3099, collected May 20, 1896, near the mouth of the Potlatch. The species resembles *T. uniflora* in the dried state, but is of an entirely different habit. Instead of growing in shaded woods, in rich, loose ground, it is found in open, gravelly, or rocky ground, where it flourishes best. Specimens found near bushes were always dwarfed and stunted.

The same plant was collected on the rocky hills on the right bank of the Clearwater above Lewiston, by Sandberg, MacDougal and Heller, in 1892, under no. 11, and determined by Holzinger as *T. uniflora*, in Cont. U. S. Nat. Herb. 3: 245. Although I have often collected *T. uniflora* in the woods of Pennsylvania, this Idaho plant, when seen growing, was not for a moment considered identical with it.

UNIVERSITY OF MINNESOTA, MINNEAPOLIS, MINN.

Botanical Notes.

The Botanical Society of America.—The third annual meeting of the Society will be held in Toronto on Tuesday and Wednesday, August 17th and 18, 1897, under the presidency of Dr. John M. Coulter. The Council will meet at 1 p. m. on Tuesday and the first session of the Society will begin at 3 p. m. The address of the retiring president, Dr. Charles E. Bessey, will be given on Tuesday evening at 8 o'clock. The British Association for the Advancement of Science will meet in Toronto August 18th to 25th. The opening address is to be given on Wednesnay evening, August 18th.

A new Botanical Serial.—The Royal Botanical Garden of Palermo, has just issued the first number of its new Bulletin under the title of Bolletino del R. Orta Botanico diPalermo. It is edited by Sig. Alberto Reber and is to be published every three months, the first number consisting of about 40 pages with a few illustrations in the text. A following number is to contain the Annals of the famous old garden from which the new Bulletin has also taken its title.

Mosses of the Southern States, issued by Dr. John K. Small. The first half century of this interesting set of mosses is ready for sale. The specimens have mostly been collected by Dr. Small, but he has also had the assistance of other collectors, such as Professor Wetherby in North Carolina. Dr. Small has made repeated visits to several interesting localities such as Toccoa, and Tallulah Falls, and Stone and Grandfather Mountains. The first half century includes the following rare or interesting species: *Hypnum nemorosum*, *H. Marylandicum*, *Entodon Drummondii*, *Thamnium Alleghaniense*, *Anomodon Toccoae*, *Fissidens Ravenelii* and *F. polypodioides*, *Clasmatodon parvulus*, *Syrrhopodon Floridanus* and *Campylopus Tallulensis*. There are two new species issued: *Rhynchostegium spinoserratum* closely allied to *R. serrulatum*, and *Dicranodontium innundatum* both newly discovered by Dr. Small. *Dicranodontium Millspaughii* is also distributed for the first time. The sets may be had at $5.00 for 50 species. E. G. B.

Fondation Müller-Argau, 1896. It is due to Ed. Tuckerman († the 15th of March 1886) that libraries accessible to all have been

recognized as one of the actual requirements for the development of the special branches of botany, at all events for lichenology. This eminent lichenologist has left his lichenological library to Amherst College Library, Mass., U. S. A., with the condition that this library should be preserved and developed as a special department of this institution. This foundation is known under the name of "The Tuckerman Memorial Library." Every student of lichens who wishes to see his science progress will carry out the last wishes of Tuckerman.

It is satisfactory to hear that the example of Tuckerman has found an imitator. At the suggestion of a well known lichenologist, Dr. A. Minks, of Stettin, the directors of the Boissier Herbarium have instituted a *Hall Müller-Argau*, especially consecrated to the lichenological library and exsiccata, the basis of the works of Müller-Argau. By an ageeement signed January 6, 1886, the scientific collections of Müller-Argau have become at his death, January 25, 1896, the property of the Boissier Herbarium, under the name of FONDATION MUELLER-ARGAU.

In a purely scientific interest the directors of the Boissier Herbarium beg botanists to be so good as to send to the address below all lichenological publications which have appeared since the death of Müller or may appear hereafter. As papers reprinted for private circulation are and should be found in special libraries in series as complete as possible, the attention of authors is called to this point that they may forward their works to the library.

Another not less important desideratum is that creators of new lichen species, collectors of rare lichens, or of important materials for morphological and biological researches in the domain of lichens, be so good as to deposit specimens in the LICHENOTHECA UNIVERSALIS MUELLER-ARGAU, which contains already the complete herbarium of the Bernese F. Schaerer (1785–1853).

A special receipt will be sent for each gift, which will be annually recorded in the "Bulletin of the Boissier Herbarium."

We beg botanical societies and editors of botanical periodicals to kindly help towards the success of this new foundation by making it widely known.

EUGENE AUTRAN,
Curator of the Boissier Herbarium.

CHAMBESY NEAR GENEVA.
March 20, 1897.

Reviews.

Annual Report of the State Botanist of the State of New York. (48 Regent's Report.) Charles H. Peck. 4to. Pp. 241. Plates A, 1–43. 1896.

The familiar but unfortunately too rare report of the State Botanist appears this time under a new form and as a special separate in order to accommodate a part of Professor Peck's work on the Edible Mushrooms of New York. The body of the work contains the usual report of plants new to the State, including 11 new species of Fungi (pp. 11–17), followed by a descriptive synopsis of the New York species of *Carex*, by E. C. Howe (pp. 20–104). But the most important portion of the work is the account of "Edible and Poisonous Fungi of New York" (pp. 105–238, 42 plates). After some general discussion of the subject there follow detailed descriptions of 63 edible species and four that are poisonous or unwholesome. Each species is illustrated with a colored plate. The demand for the report has been so great that the limited edition was rapidly exhausted. It is to be issued, however, in the usual octavo form of the reports of the State Museum and can be purchased from the State Librarian at Albany.

Mr. Peck's accuracy of description is too well known to need any commendation here. The plates, while rendered by the process of reproduction in a rather stiff form and lack of artistic spirit, are recognizable and will readily serve as a guide to the objects they represent. The plates of the morels and *Fistulina* are probably the poorest of the series, but these are fortunately not likely to be confused with anything else. In the absence of any work of the kind obtainable at a low price—Gibson's artistic volume being beyond the means of many—the present work will prove a real help in aiding the rapidly growing number of mycophagists in recognizing the edible species of woods and fields, and introduce the subject to many citizens who ought to know something of the valuable food supply that every year goes to waste in prodigious quantity. L. M. U.

Age of the Lower Coals of Henry County, Missouri. David White. Bull. Geol. Soc. Am. **8**: 287–304. Mr. 1897.

The correlation of these coals with those of other regions, is

made by means of an examination of the fossil flora. The species determined number 123: Fungi, 2; Ferns, 70; Calamariae, 14; Sphenophyllae, 5; Lepidodendrae, 13; Sigillariae, 6; Taeniophylleae, 2; Gymnosperms, 10; doubtful, 1.

It is of interest to note that the one species of doubtful classification is *Palaeoxyris* which is placed under Animalia (?) A table of distribution is given for such species as occur in other American coal basins, also tables showing distribution of the same or closely related species in Great Britain and Franco-Belgium.

The conclusions from such comparisons are that the coals in question are about the horizon of the Lower Kittaning of the bituminous series of the Marcy (D) coal of the northern anthracite field of eastern North America, the middle and upper coal measures of Great Britain and the upper zone of the Valenciennes series, the Geislantern beds of the Saarbrück series of the Rhenish coal regions in the upper part of the Schatzlar series and in the Radnitz series of central Bohemia.

A. H.

An Illustrated Flora of the Northern United States, Canada and the British Possessions, from Newfoundland to the parallel of the southern boundary of Virginia, and from the Atlantic Ocean westward to the 102d meridian. By Nathaniel Lord Britton, Ph.D., Emeritus Professor of Botany in Columbia University and Director-in-Chief of the New York Botanical Garden, and Hon. Addison Brown, President of the Torrey Botanical Club. In three volumes. Volume II. Royal 8vo. Pp. 643. New York. Charles Scribner's Sons. 1897. Price per volume, $3.00.

The second volume of this admirable work, which has just been issued from the press, will be gladly welcomed by all those who have made the acquaintance of the first one. In accurate typography, as well as in the keys, descriptions and illustrative figures of the species, it is fully up to the high standard of its predecessor, so well and thoroughly reviewed by Dr. Rusby in the BULLETIN of September, 1896.

The families contained in it occur in the following order:

CHORIPETALAE (continued) 1–546

20. Portulacaceae 1
21. Caryophyllaceae 6
22. Nymphaeaceae 41
23. Ceratophyllaceae 46
24. Magnoliaceae 47
25. Anonaceae 49
26. Ranunculaceae 50
27. Berberidaceae 89
28. Menispermaceae 93
29. Calycanthaceae 94
30. Lauraceae 95
31. Papaveraceae 98
32. Cruciferae 108
33. Capparidaceae 154
34. Resedaceae 158
35. Sarraceniaceae 159
36. Droseraceae 160
37. Podostemaceae 163
38. Crassulaceae 163
39. Saxifragaceae 169
40. Grossulariaceae 187
41. Hamamelidaceae 192
42. Platanaceae 194
43. Rosaceae 194
44. Pomaceae 232
45. Drupaceae 246
46. Mimosaceae 254
47. Caesalpinaceae 256
48. Krameriaceae 261
49. Papilionaceae 262
50. Geraniaceae 340
51. Oxalidaceae 344
52. Linaceae 348
53. Zygophyllaceae 351
54. Rutaceae 352
55. Simarubaceae 354
56. Polygalaceae 355
57. Euphorbiaceae 361
58. Callitrichaceae 381
59. Empetraceae 383
60. Buxaceae 384
61. Limnanthaceae 385
62. Anacardiaceae 385
63. Cyrillaceae 389
64. Ilicaceae 390
65. Celastraceae 393
66. Staphyleaceae 396
67. Aceraceae 396
68. Hippocastanaceae 400
69. Sapindaceae 402
70. Balsaminaceae 403
71. Rhamnaceae 405
72. Vitaceae 407
73. Tiliaceae 413
74. Malvaceae 415
75. Theaceae 426
76. Hypericaceae 427
77. Elatinaceae 437
78. Cistaceae 439
79. Violaceae 445
80. Passifloraceae 457
81. Loasaceae 458
82. Cactaceae 460
83. Thymeleaceae 465
84. Elaeagnaceae 466
85. Lythraceae 468
86. Melastomaceae 473
87. Onagraceae 475
88. Trapaceae 500
89. Haloragidaceae 500
90. Araliaceae 505
91. Umbelliferae 508
92. Cornaceae 542

GAMOPETALAE 548–623

1. Clethraceae 548
2. Pyrolaceae 549
3. Monotropaceae 554
4. Ericaceae 556
5. Vacciniaceae 573
6. Diapensiaceae 582
7. Primulaceae 584
8. Plumbaginaceae 594
9. Sapotaceae 595
10. Ebenaceae 596
11. Symplocaceae 597
12. Styraceae 598
13. Oleaceae 600
14. Loganiaceae 604
15. Gentianaceae 606
16. Menyanthaceae 621

The two volumes now published afford satisfactory material for a fair judgment upon the claims of the Flora as a whole, and every student of the pteridophytes and anthophytes of the region covered by it cannot fail to admire its excellence and feel surprised at the large number of new species gleaned from fields already well explored. The promise is that its appearance will give a fresh and lasting impulse to the study of systematic botany not only within the geographical limits chosen, but in other portions of our country further south and west. Its moderate cost, in view of its great wealth of illustration, must bring it into general favor and use, even among those whose interest in the plant-world is not strictly or purely scientific; and the wide diffusion of such accurate knowledge is a thing of inestimable value.

The third volume, now in the printer's hands, will be issued at an early day, perhaps before the year closes, and will end with the *Compositae*, the family to which the highest place in the vegetable creation has been assigned.

THOS. C. PORTER.

Proceedings of the Club.

TUESDAY EVENING, May 11, 1897.

In the absence of officers, Dr. N. L. Britton was called to the chair. There were 13 persons present.

Three new members were elected: Robert P. Leslie, George H. Payne, Miss Harriet M. Denison.

The Chairman of the Field Committee, Dr. John K. Small, reported three excursions held as announced well attended and productive of much interest.

The Club adopted the following resolutions presented by Dr. H. M. Richards, in memory of Dr. Gregory, the late honored professor of botany at Barnard College.

"WHEREAS, our esteemed fellow member Miss Emily L. Gregory is lost to us by death, therefore, it is

"*Resolved*, That in realization of our loss we express our deep sorrow for this sad event, at this untimely period when she was just about to enter upon a new era in her career as a teacher, to which we all, with her, had looked forward with happiest anticipations, and

"*Resolved*, That we have lost in her an accomplished scientist, a devoted teacher, a warm-hearted, generous friend, and

"*Resolved*, That a copy of these resolutions be presented to her surviving relatives to whom we extend our sincerest sympathy."

Dr. Britton anuounced that Mrs. Britton had prepared an obituary notice of Miss Gregory, with the aid of relatives and of Dr. Richards; to be accompanied by an artotype for publication in the BULLETIN.

Prof. Underwood announced that an excellent portrait of Dr. Gregory had been presented by friends to the Department of Botany at Barnard and to that at Columbia.

Prof. Underwood also announced the recent gift by President Low to Columbia University of a valuable series of 50 water-color plates prepared by the late lamented William Hamilton Gibson, for illustration of his work on mushrooms. It is the intention to frame them and place them on the walls of the new laboratory where they will be prized for their unusual combination of artistic excellence with scientific accuracy.

Prof. Britton made a report relative to the progress of the Botanical Garden. A beginning is made in planting the systematic herbaceous garden. Eight acres are set aside for this with the families grouped in beds; the intention is to get as many of each genus together as will grow in this climate in the open. Several hundred species are already in place, and quite a display is already produced by the beds of the Ranunculaceae, Compositae, Iridaceae and Cruciferae. Seeds of some 3,000 different species are now planted in the nurseries, including 2,240 species generously sent from Kew.

The paper of the evening was by Mr. Marshall A. Howe, entitled, "A preliminary Comparison of the Hepatic Flora of California with that of Europe and of the eastern United States."

Mr. Howe alluded to the distribution of *Cephalozia Turneri*, a rare hepatic of Europe, frequent in the coast ranges of California, and occurring in limited numbers in a few localities in Ireland, England, France and the Mediterranean region.

Mr. Howe presented the following table exhibiting the comparative distribution so far as yet known:

	Cal.	Gray Manual Region.
Total No. of Species	77	145
In common with the British Isles	34 or 44 %	78 or 54%
In Central and Northern Europe	40 or 52 %	91 or 63%
In Mediterranean Region	45 or 58½%	78 or 54%
Peculiar to Pacific Coast	26 or 34 %	
In common with the Gray Man. Reg.	37 or 48 %	
Peculiar to Gray Manual Region		40 or 28%
In common with California		32 or 22%

It will be seen that the hepatic flora of California has more in common with that of northern and central Europe than with the eastern United States, and is still more allied to that of the Mediterranean region. In particular species of *Asterella* and *Riccia* are better developed in California and southern Europe than in the eastern United States.

The apparent absence in California of *Bazzania* and *Mylia* which are especially characteristic of medial and boreal regions, serves to heighten the similarity to southern Europe.

The paper was followed by exhibit of photomicrographs of sections of *Cryptomitrium*, illustrating the development of the archegonia.

Discussion by Prof. Underwood, Prof. Britton and others followed. Prof. Underwood, in answer to inquiry as to the region where the Hepaticae are most abundant, suggested the Amazon region and the eastern slope of the Andes, also Java. Insular tropical regions have furnished many where examined, as Cuba and Jamaica. Quite a number are peculiar to Australia. New Zealand is well supplied with them. Many have been recently collected in Africa, and have been described by Herr Stephani of Leipsic, whose industry has doubled the number of described Hepaticae. As a whole the maximum development of the Hepaticae is tropical, though some genera and certain groups within genera are wholly high-temperate or subarctic.

Prof. Britton remarking the indications of circumboreal and circumtropical distribution of certain species, referred to the argument for an equatorial distribution of flowering plants and of ferns, and queried if there were anything corresponding among Hepaticae.

Prof. Underwood referred to the influence of the Gulf Stream in permitting the occurrence of the subtropical genus *Lejeunia* on the coast of Ireland, a genus not elsewhere found in Europe. Comparing the Hepaticae of Florida, they are only in part known; a few species are in common with the Appalachian flora; most of the Florida hepatica are close-creeping forms found on bark, as *Frullania* and *Lejeunia*, having water sacs on their leaves as aids in resisting drought. Some tropical Marchantiaceae occur in Florida, and also, especially, species of *Riccia* and *Anthoceros*. *Thallocarpus* is known only from Florida and South Carolina.

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